

DOCUMENT RESUME

ED 246 870

IR 011 202

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TITLE Computers in the Schools: State/Provincial Implications.
PUB DATE Apr 84
NOTE 8p.; Paper presented at the Annual Meeting of the American Educational Research Association (New Orleans, LA, April 23-27, 1984).
PUB TYPE Reports - Descriptive (141) -- Speeches/Conference Papers (150)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Computer Assisted Instruction; Computer Literacy; *Computers; *Courseware; Evaluation Methods; Foreign Countries; *Inservice Teacher Education; Media Selection; *Policy Formation; Program Development; *State Programs
IDENTIFIERS *Alberta; Software Evaluation

ABSTRACT

The Alberta government has attempted to systematically address educational computing issues through programs of the provincial (K-12) education department (Alberta Education), which have included the development of computer literacy curricula for elementary, junior, and senior high schools; the Computer Technology Project (CTP); evaluation studies; and the Minister's Task Force on Computers in Schools. These efforts were designed to address major computing issues of availability and quality of educational software; provision of teacher inservice opportunities; computer literacy for students; and short- and long-range planning for educational computing activities. All courseware evaluation activities and seminars have been standardized on the Apple II microcomputer. Emphasis has been on evaluating existing programs before developing new courseware. The CTP focuses on teacher inservice and courseware evaluation, including: (1) development of computer-related inservice seminars; and (2) systematic evaluation of Apple II instructional courseware by subject area through a three-stage evaluation process. Other departmental activities have included provincial governmental assistance for school districts purchasing microcomputers for business education programs, and a small grant to each school system for professional development. (LMM)

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ED246870

COMPUTERS IN THE SCHOOLS: STATE/PROVINCIAL IMPLICATIONS

A Paper Presented at the Annual Meeting of
the American Educational Research Association

New Orleans, LA.

April, 1984

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Computers in the Schools: State/Provincial Implications

A. Introduction:

Educators have been interested in the instructional use of technology for many years. During the 1960s and 1970s, school districts with access to computers were experimenting with Computer-Assisted-Instruction (CAI) and Computer-Managed-Learning (CML). However, the relatively high cost of computer time and lack of appropriate software prevented any widespread introduction of CAI or CML throughout the school systems.

The development of microcomputers has provided a number of advantages for the educational use of computers. At a relatively low cost, considerable computing power and storage are available in a machine that is small in size and often transportable. The machines are remarkably indestructible compared to the mainframe computers of ten years ago. With the variety of peripherals available, home and school computer users can access large data bases at remote sites. Software costs are becoming more reasonable than they have been. Because microcomputers have come within the financial capability of so many people, software developers have begun producing some good quality software at an affordable price.

In this paper, I will describe the educational computing policies established by Alberta Education. The Computer Technology Project was organized to address the major computing issues as we understood them at that time. They continue to be the major hurdles which must be overcome if students are to use computers effectively in their educational programs.

B. Background:

Alberta Education, the provincial government department responsible for K-12 education in the Province of Alberta, Canada, has been involved in educational computing for about ten years. Initially these activities were through research and development projects. Our latest efforts have been through the development of computer literacy curricula for elementary, junior and senior high school, the Computer Technology Project (CTP), evaluation studies, and the Minister's Task Force on Computers in Schools.

The major issues which the Computer Technology Project and the related activities were designed to address are: availability and quality of educational software; provision of teacher inservice opportunities; computer literacy for students; and short and long-range planning for educational computing activities.

It is interesting to note that the educational computing issues identified by Agency for Instructional Television (AIT) consortium representatives closely parallel the concerns Alberta Education was addressing in 1981. AIT members identified the following major issues: curricular; courseware; teacher-related; roles of other constituents; and funding and acquisition (Solutions Unlimited: Delphi Study on Policy Issues in the Introduction and Management of Computers in the Classroom, October, 1983, p.9).

C. Educational Computing Issues:

When Alberta Education's Planning and Research staff discussed the establishment of a province-wide initiative to address the problems associated with educational computing, there were some major concerns which were considered. These concerns centered on the matter of educational software; professional upgrading of teachers; provision of hardware; planning; and research and evaluation.

In the matter of educational software, it was decided that computer programs which provide drill and practice, tutorial, simulation, problem-solving and other instruction and instructional support were a learning resource similar to textbooks, workbooks, and other such materials. Therefore, control of the learning resource approval process would remain within Alberta Education, in the same way that approval for textbooks rests with the Provincial Government.

Alberta Education standardized all the courseware evaluation activities and inservice seminars on one microcomputer, because there were, and continue to be such a wide variety of microcomputer operating systems that are not compatible. The position taken was that the most important activity is student learning. Therefore, availability of high quality courseware was the primary focus of the debate relative to the decision as to which microcomputer should be selected. In addition, factors such as reliability, serviceability, track-record in schools, capability, expandability, and price of the hardware were considered.

As noted in Research Report No. 90, courseware development was considered the second most important issue by the respondents. However, developing courseware products without first evaluating existing materials might lead to wasting money. For example, if certain courseware materials are required, considerable money could be invested in developing those packages. Because evaluating courseware is considerably less expensive than developing it, evaluation prior to development is the most cost-effective strategy.

It has been assumed that courseware development will be required in order to provide computer-related materials for the Alberta curriculum. But our position has always been that of ascertaining what good quality packages exist, and then determining in which instructional program areas it will be necessary to fund the development of appropriate courseware materials. During the process of evaluating the courseware, we have been collecting information which will become our courseware development standards and guidelines. We expect to publish these guidelines within the next six months.

Of equal importance to courseware evaluation is the need for professional upgrading and training of teachers. Therefore, a person was hired to plan, coordinate, and deliver inservice seminars. Obviously, one person cannot do all that is needed. However, many school districts have used the pyramid approach and through the process of teachers helping teachers have been able to provide excellent inservice for the majority of their instructional staff.

A very important activity, in a field which changes so rapidly, is planning for the future. Through the establishment of the Minister's Task Force on Computers in Schools, the Minister of Education received 48 recommendations suggesting future policy actions which should be implemented in order to provide the best computer education possible for the students within Alberta. These proposals were for actions in each of the major areas identified in the A.I.T. policy study.

Finally, research and evaluation studies are being mounted to attempt to find some answers and conclusions regarding the questions raised by many educators about the effectiveness of computers in classrooms.

D. Computer Technology Project Activities:

The major thrusts of the Computer Technology Project are teacher inservice and courseware evaluation.

Our Inservice Manager provides a variety of services, upon request, to the 150+ school districts in Alberta. His responsibilities are to plan inservice workshops; coordinate the delivery of those workshops; conduct seminars as time permits and, if his calendar is already booked, refer those who request the seminars to people able to provide competent training; and finally, to consult with school systems regarding their inservice requirements.

Obviously, there is considerably more work than any one individual can manage. There are some very able seminar leaders available within Alberta, many already employed within the school systems. Our Inservice Manager is now beginning to spend more time providing instruction to the seminar leaders, rather than to the uninitiated teacher.

Beginning in this present fiscal year, the Alberta Government will be putting a considerable amount of funds into the "inservice" area. One of the three major priorities of the Government will be computer-related inservice seminars. We expect this will significantly increase the demands upon the Inservice Manager.

Courseware evaluation activities are administered through the section of the Computer Project called the Clearinghouse. When the CTP was announced, one of the policy decisions that we made was to indicate that all our evaluation activities would be conducted for only one microcomputer format. This decision was made because: courseware for one brand of microcomputer does not run on most other brands; there was more educational software for the Apple II+ (1981) than all the other brands combined; that microcomputer had a fine track record in schools throughout North America; of its capabilities, price, reliability; and the widespread availability of a variety of peripherals that could be attached to that particular microcomputer. Thus, even though there was an element of standardization in the decision, the one kind of computer could be used for many purposes.

Another reason for starting the courseware evaluation activities at the provincial level was the increasingly large number of sources of educational software. Most of the small and medium sized school districts depend upon the Provincial government for evaluation of learning resource materials, so moving our evaluation activities into the computer software area was a natural extension of that service.

In Canada, the provincial governments control the program of studies for the schools within the individual Provinces. So that a systematic approach would be taken toward the evaluation activities, we decided to evaluate courseware one subject at a time. Mathematics, Grades 1 to 12, was the first subject area chosen. When we began, in September, 1982, about 200 package titles were identified. Within a year, over 400 titles were available, and about 50 to 60 new packages are appearing on the market each month. Each package consists of at least one diskette and accompanying documentation, with some packages containing up to 35 diskettes and print materials. At the present time, evaluations are being conducted in mathematics, science, special education, library management and business education.

Our search is also limited to software that has an instructional component. Games, utility packages, and administrative software are not evaluated at this time. However, in business education we obviously have had to make some exceptions.

Using a combination of print files, computer records and data bases, more than 1,000 titles from over 450 distributors have been identified. Eight hundred packages have been evaluated, as of March 31, 1984, and over 300 are in progress.

The three stage evaluation process consists of screening the software to determine if it meets minimum requirements. If the courseware seems to warrant additional evaluation after the first-stage screening process, the package is then independently evaluated by three teachers. These evaluators are subject area specialists who have been trained, in an intensive two-day workshop, to use the Alberta Education developed evaluation instrument and who have passed an accreditation test. All training costs are assumed by Alberta Education. Evaluators are paid an hourly rate for their work. The evaluations done by the three different teachers comprise the second stage in our evaluation process.

Software packages which pass this second stage are then evaluated for curriculum congruency. Products which pass this third stage (curriculum congruency) may then be designated as learning resources for Alberta schools. Three categories are used: prescribed; recommended; or supplementary. The entire three stage process will usually take from six to eight months to complete.

Our purpose is to provide teachers with sufficient information so they can make informed purchase decisions. In addition to this objective data, subjective evaluation information also is provided. Because these evaluation reports are based on classroom use by three different teachers, we believe that the evaluation reports are valid and reliable.

Getting the evaluation information to the schools has been done through a variety of means. Our formal evaluation report, sent to all Alberta schools, contains full reviews of software products that received favorable reviews, lists of titles we were unable to recommend, and lists of titles which will be evaluated in the near future. To date, two reports have been published, and the next one is scheduled for release in September, 1984.

Finally, titles which are designated as "prescribed" or "recommended" are acquired in bulk by Alberta Education and made available to Alberta schools at discounted prices through the School Book Branch. In addition, we have purchased a provincial licence for the software from the Minnesota Educational Computing Consortium (MECC). These diskettes are available from an Alberta crown corporation at a cost of \$8.00 per diskette plus \$3.00 for documentation.

With respect to finding good quality courseware, our latest results should not be a surprise. During the first stage, about 75 percent of the packages are rejected. By the end of the third stage, about 90 percent of the titles will have been eliminated.

For the most part, the packages are rejected because the content range is inappropriate; the content sequence is poorly developed; the content depth is inadequate (that is, the instruction is superficial and the amount of skill practice is insufficient); user interaction is inadequate (the "courseware" is only an electronic page-turning device, and student involvement is reading the screen); and the feedback to students is inadequate (if a student enters an incorrect answer to a question, the computer's response is nothing more than the correct answer).

E. Other Departmental Activities:

Computer literacy curricula for Grades 4-12 have been developed. These programs are considered temporary, until the time when computers become integral tools in regular classroom instructional activities. The computer literacy curriculum is for all students at the elementary level, and because of other program requirements is optional at the junior and senior high school levels.

This year the provincial government decided to assist school districts who wish to purchase microcomputers for use in business education programs. Part of the funding allocated to this activity will be used for microcomputers at the elementary and junior high school levels. In this particular program, the provincial government will match, on a dollar for dollar basis, the money invested by the local school jurisdiction. A funding floor and ceiling are built into the program. School systems are encouraged to document their planning activities relative to the educational use of computers, as part of receiving their grant.

Another additional provincial government funding project this year is the designation of a small grant to each school system for professional development of their teachers. The only restrictions to the use of these funds is that the inservice must be within the three designated areas of priority. For 1984-85, one of those three areas is educational computing.

F. Summary:

The Alberta Government has attempted to systematically address educational policy issues. If a government body, whether federal, provincial, state or local, decides to wait until answers to all the issues have been fully clarified, it will NOT make any policy decisions regarding educational computing. Such questions as equal educational access to computers, what roles will computers have in the school curriculum, and what organizational plans have been successful in introducing and managing the use of computers in schools will be fully and properly answered primarily through actual experience.

In setting provincial policies in educational computing, a primary consideration was the need for local school districts to develop their own individual plans. Even though a policy decision to evaluate only Apple II+ and //e courseware was made, local districts are not required to purchase only that computer. If they have a specific need to make use of some other unit they are free to do so.

Professional upgrading of teachers should be the responsibility of individual educators. School districts and state and provincial governments can provide opportunities for such upgrading, but unless individual teachers want to increase their skills, all the effort by administrators and policy makers will not result in effective professional development.

F. Concluding Comments:

This document is an attempt to describe the actions that have already been taken by a provincial government in an attempt to manage the introduction and use of microcomputers in K-12 schools. While it may seem to outsiders that some of the policies are restrictive, the results have been satisfactory.

Courseware is being evaluated systematically. Educators within Alberta know and understand that if they wish to take advantage of information regarding courseware, then Apple computers are the ones to use. Had no such policy decision been made, it could be very difficult to approach the courseware evaluation issue without either alienating a sizeable group of computer users, or without investing a considerable sum of money in the evaluation process.

Because the provincial government made this type of policy decision, many school districts have made their own policy decisions regarding the use of computers in their classrooms. Whether their decision to standardize corresponded to the Alberta government decision or not, the fact that the administrators gave serious consideration to the matter is evidence of the thought and planning invested in their decision.

Reference:

Agency for Instructional Television, Research Report #90: Solutions Unlimited: Delphi Study on Policy Issues in the Introduction and Management of Computers in the Classroom, Bloomington, Indiana: Agency for Instructional Television, October, 1983.